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ADVANCED TELEVISION TECHNOLOGY CENTER

Digital Audio Broadcasting

**Analog Main Channel Compatibility
and Digital Performance
of the
iBiquity Digital IBOC System
in the FM Band**

Summary of Test Results

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1. Introduction

This report contains the results of tests conducted by the Advanced Television Technology Center (ATTC) on the **iBiquity Digital FM In-Band On-Channel (IBOC) Digital Audio Broadcasting (DAB) System** during the period of February through July 2001.

1.1. Scope

The results reported in this document are collectively referred to as (1) *Analog Compatibility Testing*, and (2) *Digital Performance Testing*. The objective of analog compatibility testing is to evaluate and characterize the impact that an IBOC DAB system would have on the existing analog radio services within the FM broadcast band. These tests were performed under controlled laboratory conditions that simulate interference due to digital sidebands on both adjacent channels and the analog host channel.

The objective of the digital performance testing is to quantify the performance of IBOC DAB system under varied RF channel conditions. The IBOC signal is subjected to a wide variety of interference and RF channel conditions. For each condition, the performance of IBOC is evaluated.

Details of the actual test scenarios can be found in ATTC Document No. 01-03¹.

¹ Digital Audio Broadcasting, IBOC Laboratory Test Procedures – FM Band, Document No. 01-03, Revision 4.2, July 2001, Advanced Television Technology Center, Inc.

2. Description of the Test System and Parameters

2.1. Test Bed Description

The ATTC DAB Test Bed configuration is described in detail in ATTC Document No. 01-01². The Test Bed was used to numerically quantify Signal-to-Noise (S/N), Stereo Separation, and Block Error Rate (BLER). The Test Bed was also used to produce digital audio recordings.

The performance of the ATTC Test Bed was verified according to the proof of performance plan detailed in ATTC Document No. 00-05³. The results of the proof are documented in ATTC Document No. 01-01².

2.2. FM Band Signals

2.2.1. Desired Analog

In all cases, the desired analog FM signal had the following characteristics:

- 1) Main channel modulation:
 - a) Stereo transmission
 - b) 75µs pre-emphasis
 - c) 10% pilot injection
 - d) Test dependent audio
 - i) **Objective Compatibility Tests (Type I):** Sinusoidal test tone of 1kHz at 90% modulation (67.5kHz deviation) with no dynamic range processing. Pilot contributes 10% for total modulation = 100%
 - ii) **Subjective Compatibility and Performance Tests (Type II):** Appropriate critical listening material peaking at 90% modulation (67.5kHz deviation) with dynamic range processing consistent with the musical genre of the audio. Pilot contributes 10% for total modulation = 100%
 - iii) **Objective Performance Tests:** Clipped Pink Noise at 90% modulation (67.5kHz deviation) with no dynamic range processing. Pilot contributes 10% for total modulation = 100%
 - 2) Subcarriers: None
 - 3) Main Carrier:
 - a) 97.9 MHz
 - 4) Power
 - a) Weak: -77dBm
 - b) Moderate: -62dBm
 - c) Strong: -47dBm

² Digital Audio Broadcasting, Test Bed Proof of Performance Record, Document No. 01-01, Revision 1.0, January 2001, Advanced Television Technology Center, Inc.

³ Digital Audio Broadcasting, Test Bed Proof of Performance Plan, Document No. 00-05, Revision 1.1, December 2000, Advanced Television Technology Center, Inc.

2.2.2. Desired Hybrid

This signal is defined as the spectral sum of an analog desired signal and the digital carriers as generated by an iBiquity Digital IBOC exciter in hybrid mode. The digital carriers utilize OFDM modulation. The sum of *all* digital carriers in the hybrid signal has an *average* power that is 20 dB below the average analog power.

2.2.3. Undesired Analog Interferer

In all cases, an undesired analog FM interferer had the following characteristics:

- 1) Main channel modulation:
 - a) Stereo transmission
 - b) 75 μ s pre-emphasis
 - c) 10% pilot injection
 - d) Test dependent audio
 - i) **Objective Compatibility Tests (Type I)**: Chipped Pink Noise with peaks equal to 90% modulation (67.5 kHz deviation). Pilot contributes 10% for total modulation = 100%.
 - ii) **Subjective Compatibility and Performance Tests**: Processed Rock with peaks equal to 90% modulation (67.5 kHz deviation). Pilot contributes 10% for total modulation = 100%.
 - iii) **Objective Performance Tests**: Processed Rock with peaks equal to 90% modulation (67.5 kHz deviation). Pilot contributes 10% for total modulation = 100%.
 - 2) Subcarriers: None
 - 3) Main Carrier:
 - a) For upper 1st adjacent: 98.1 MHz
 - b) For upper 2nd adjacent: 98.3 MHz
 - c) For co-channel: 97.9 MHz
 - d) For lower 1st adjacent: 97.7 MHz
 - e) For lower 2nd adjacent: 97.5 MHz

2.2.4. Undesired Hybrid Interferer

In all cases, the undesired hybrid interferer was the spectral sum of an analog undesired signal and the digital carriers as generated by an IBOC exciter in hybrid mode. The analog portion of the signal had the same characteristics as outlined above. The sum of all digital carriers in the hybrid signal shall have an *average* power that is 20dB below the average analog power.

2.2.5. Additive White Gaussian Noise

When specified for compatibility tests, the channels of interest were subjected to Additive White Gaussian Noise (AWGN) at a level of 30,000 degrees Kelvin. For digital performance testing, the channels of interest were subjected to AWGN when specified, at various levels.

2.2.6. Impulse Noise

Impulse noise was generated using a pulse-gated 97.3 MHz CW signal (at 600 kHz below the desired channel center frequency). The pulse duration was 5 μ s. The pulses occurred at either fixed repetition rates or pseudo-randomly, as specified.

2.3. Baseband Audio

2.3.1. Clipped Pink Noise

In order to approximate the program material of a typical FM rock station; a CD recording was made of a ‘clipped pink noise’ signal. For cases where two simultaneous interferers are required a second CD recording was made. Each recording is played on two different CD players so that the signals are not correlated with each other in time.

2.3.2. Processed Rock

In addition to the clipped pink noise described above, a standard interferer was generated which simulates “processed rock” (which is assumed to be one of the worst interferers). While clipped pink noise does an excellent job of producing maximum deviation with a low peak to average ratio, as an interferer it is missing one critical component which many *human* listeners find objectionable – the beat. For this reason a processed rock interferer was used in subjective tests.

As in the case of clipped pink noise, a CD recording of “processed rock” was made. For the cases of two simultaneous interferers, two sources were used with time offset from each other.

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3. Description of Test Receivers

The following FM receivers were used for the compatibility tests and as the analog reference for the subjective performance tests:

Radio Model No:	Serial No:
Delphi 09394139 (Automotive)	89DDSTM103490265
Pioneer KEH-1900 (Automotive)	UHHI086599UC
Technics SA-EX110P-K (Hi-Fi)	GX9DA84758
Sony CFD-S22 (Portable)	S01-0433905-A

These receivers were characterized by CEA and delivered directly to ATTC.

The IBOC system consists of the FM IBOC exciter (software version 3.04/fh 0.21) and IBOC receiver (software version 3.06/fhd.51).

4. Analog Compatibility Results Summary

4.1. Objective Results Summary

The Weighted Quasi-Peak Signal-to-Noise Ratio (WQP SNR) of each receiver was objectively measured under various interference scenarios over a range of D/U signal ratios⁴. The test results are presented in the following series of tables. Each row of the tables represents one test designated by an ATTC test number. In the *Desired* column, the strength of the desired analog signal is indicated: *Strong* (-47 dBm), *Moderate* (-62 dBm), or *Weak* (-77 dBm). In the interferer columns, the mode of the interferer is indicated: *Analog* or *Hybrid*. Each interferer also has a fixed D/U number (e.g. +6) next to it indicating that the strength of this interferer is fixed at that particular D/U ratio. The *AWGN* column indicates the presence or absence of a broadband noise floor. The *WQP SNR* column indicates the test result in dB.

For the tests of IBOC interference into the host FM channel measurements of stereo separation were also made. The *L/R Separation* column indicates the test result in dB.

4.1.1. Single Interferers into the Main FM Channel (NRSC F.1 and F.2)

Table 1 summarizes the results of the objective compatibility tests for single interferers into the main FM channel (NRSC F.1 and F.2) of the Delphi 09394139 automotive receiver. Table 2 summarizes the results of the objective compatibility tests for single interferers into the main FM channel of the Pioneer KEH-1900 automotive receiver. Table 3 summarizes the results of the objective compatibility tests for single interferers into the main FM channel of the Technics SA-EX110P-K hi-fi receiver. Table 4 summarizes the results of the objective compatibility tests for single interferers into the main FM channel of the Sony CFD-S22 portable receiver.

⁴ Throughout the remainder of this document, the following conventions are used: D refers to a desired analog signal; U refers to a single undesired interferer (which could be analog, or hybrid). If a D/U ratio is positive, then the desired signal has *more* power than the undesired signal.

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**Table 1 - Objective Test Results Single Interferer into the Main FM channel
the Delphi 09394139 automotive receiver (NRSC F.1 and F.2)**

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1001		Analog: +16dB	Analog: Moderate			None	55.1
1002		Hybrid: +16dB	Analog: Moderate			None	42.3
1003		Analog: +6dB	Analog: Moderate			None	55.1
1004		Hybrid: +6dB	Analog: Moderate			None	32.5
1005		Analog: -4dB	Analog: Moderate			None	54.7
1006		Hybrid: -4dB	Analog: Moderate			None	22.8
1007		Analog: -14dB	Analog: Weak			None	41.6
1008		Hybrid: -14dB	Analog: Weak			None	21.8
1009		Analog: -24dB	Analog: Weak			None	6.0
1010		Hybrid: -24dB	Analog: Weak			None	2.7
1011		Analog: +16dB	Analog: Moderate			30,000K	43.4
1012		Hybrid: +16dB	Analog: Moderate			30,000K	39.9
1013		Analog: +6dB	Analog: Moderate			30,000K	43.4
1014		Hybrid: +6dB	Analog: Moderate			30,000K	32.1
1015		Analog: -4dB	Analog: Moderate			30,000K	43.4
1016		Hybrid: -4dB	Analog: Moderate			30,000K	22.5
1017		Analog: -14dB	Analog: Weak			30,000K	41.4
1018		Hybrid: -14dB	Analog: Weak			30,000K	21.5
1019		Analog: -24dB	Analog: Weak			30,000K	5.9
1020		Hybrid: -24dB	Analog: Weak			30,000K	2.7
1021		Analog: Moderate	Analog: +16dB			None	55.1
1022		Analog: Moderate	Hybrid: +16dB			None	43.1
1023		Analog: Moderate	Analog: +6dB			None	55.1
1024		Analog: Moderate	Hybrid: +6dB			None	33.3
1025		Analog: Moderate	Analog: -4dB			None	54.8
1026		Analog: Moderate	Hybrid: -4dB			None	23.4
1027		Analog: Weak	Analog: -14dB			None	53.3
1028		Analog: Weak	Hybrid: -14dB			None	28.5
1029		Analog: Weak	Analog: -24dB			None	8.3
1030		Analog: Weak	Hybrid: -24dB			None	3.5
1031		Analog: Moderate	Analog: +16dB			30,000K	43.4
1032		Analog: Moderate	Hybrid: +16dB			30,000K	40.3
1033		Analog: Moderate	Analog: +6dB			30,000K	43.4
1034		Analog: Moderate	Hybrid: +6dB			30,000K	32.9
1035		Analog: Moderate	Analog: -4dB			30,000K	43.4
1036		Analog: Moderate	Hybrid: -4dB			30,000K	23.3
1037		Analog: Weak	Analog: -14dB			30,000K	49.0
1038		Analog: Weak	Hybrid: -14dB			30,000K	25.5
1039		Analog: Weak	Analog: -24dB			30,000K	8.3

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#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1040			Analog: Weak	Hybrid: -24dB		30,000K	3.5
1041	Analog: -20dB		Analog: Moderate			None	52.8
1042	Hybrid: -20dB		Analog: Moderate			None	52.8
1043	Analog: -25dB		Analog: Moderate			None	48.4
1044	Hybrid: -25dB		Analog: Moderate			None	48.4
1045	Analog: -30dB		Analog: Moderate			None	45.1
1046	Hybrid: -30dB		Analog: Moderate			None	45.0
1047	Analog: -35dB		Analog: Moderate			None	45.1
1048	Hybrid: -35dB		Analog: Moderate			None	45.2
1049	Analog: -40dB		Analog: Moderate			None	46.8
1050	Hybrid: -40dB		Analog: Moderate			None	46.8
1051	Analog: -20dB		Analog: Moderate			30,000K	43.2
1052	Hybrid: -20dB		Analog: Moderate			30,000K	43.2
1053	Analog: -25dB		Analog: Moderate			30,000K	42.6
1054	Hybrid: -25dB		Analog: Moderate			30,000K	42.6
1055	Analog: -30dB		Analog: Moderate			30,000K	42.3
1056	Hybrid: -30dB		Analog: Moderate			30,000K	42.2
1057	Analog: -35dB		Analog: Moderate			30,000K	44.0
1058	Hybrid: -35dB		Analog: Moderate			30,000K	44.1
1059	Analog: -40dB		Analog: Moderate			30,000K	46.3
1060	Hybrid: -40dB		Analog: Moderate			30,000K	46.4
1061			Analog: Moderate		Analog: -20dB	None	52.7
1062			Analog: Moderate		Hybrid: -20dB	None	52.7
1063			Analog: Moderate		Analog: -25dB	None	48.2
1064			Analog: Moderate		Hybrid: -25dB	None	48.2
1065			Analog: Moderate		Analog: -30dB	None	44.9
1066			Analog: Moderate		Hybrid: -30dB	None	44.9
1067			Analog: Moderate		Analog: -35dB	None	45.1
1068			Analog: Moderate		Hybrid: -35dB	None	45.2
1069			Analog: Moderate		Analog: -40dB	None	46.9
1070			Analog: Moderate		Hybrid: -40dB	None	46.8
1071			Analog: Moderate		Analog: -20dB	30,000K	43.2
1072			Analog: Moderate		Hybrid: -20dB	30,000K	43.2
1073			Analog: Moderate		Analog: -25dB	30,000K	42.6
1074			Analog: Moderate		Hybrid: -25dB	30,000K	42.6
1075			Analog: Moderate		Analog: -30dB	30,000K	42.3
1076			Analog: Moderate		Hybrid: -30dB	30,000K	42.2
1077			Analog: Moderate		Analog: -35dB	30,000K	44.1
1078			Analog: Moderate		Hybrid: -35dB	30,000K	44.1
1079			Analog: Moderate		Analog: -40dB	30,000K	46.5
1080			Analog: Moderate		Hybrid: -40dB	30,000K	46.5

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**Table 2 - Objective Test Results Single Interferer into the Main FM channel
the Pioneer KEH-1900 automotive receiver(NRSC F.1 and F.2)**

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1001		Analog: +16dB	Analog: Moderate			None	53.6
1002		Hybrid: +16dB	Analog: Moderate			None	41.5
1003		Analog: +6dB	Analog: Moderate			None	53.6
1004		Hybrid: +6dB	Analog: Moderate			None	31.7
1005		Analog: -4dB	Analog: Moderate			None	53.4
1006		Hybrid: -4dB	Analog: Moderate			None	21.9
1007		Analog: -14dB	Analog: Weak			None	40.2
1008		Hybrid: -14dB	Analog: Weak			None	16.1
1009		Analog: -24dB	Analog: Weak			None	15.5
1010		Hybrid: -24dB	Analog: Weak			None	4.5
1011		Analog: +16dB	Analog: Moderate			30,000K	42.5
1012		Hybrid: +16dB	Analog: Moderate			30,000K	39.1
1013		Analog: +6dB	Analog: Moderate			30,000K	42.6
1014		Hybrid: +6dB	Analog: Moderate			30,000K	31.4
1015		Analog: -4dB	Analog: Moderate			30,000K	42.5
1016		Hybrid: -4dB	Analog: Moderate			30,000K	21.8
1017		Analog: -14dB	Analog: Weak			30,000K	31.7
1018		Hybrid: -14dB	Analog: Weak			30,000K	16.1
1019		Analog: -24dB	Analog: Weak			30,000K	14.9
1020		Hybrid: -24dB	Analog: Weak			30,000K	4.6
1021			Analog: Moderate	Analog: +16dB		None	53.6
1022			Analog: Moderate	Hybrid: +16dB		None	42.0
1023			Analog: Moderate	Analog: +6dB		None	53.6
1024			Analog: Moderate	Hybrid: +6dB		None	32.3
1025			Analog: Moderate	Analog: -4dB		None	53.5
1026			Analog: Moderate	Hybrid: -4dB		None	22.4
1027			Analog: Weak	Analog: -14dB		None	41.0
1028			Analog: Weak	Hybrid: -14dB		None	16.7
1029			Analog: Weak	Analog: -24dB		None	26.5
1030			Analog: Weak	Hybrid: -24dB		None	4.9
1031			Analog: Moderate	Analog: +16dB		30,000K	42.5
1032			Analog: Moderate	Hybrid: +16dB		30,000K	39.5
1033			Analog: Moderate	Analog: +6dB		30,000K	42.5
1034			Analog: Moderate	Hybrid: +6dB		30,000K	31.9
1035			Analog: Moderate	Analog: -4dB		30,000K	41.8
1036			Analog: Moderate	Hybrid: -4dB		30,000K	22.4
1037			Analog: Weak	Analog: -14dB		30,000K	31.8
1038			Analog: Weak	Hybrid: -14dB		30,000K	16.5
1039			Analog: Weak	Analog: -24dB		30,000K	24.0

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#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1040			Analog: Weak	Hybrid: -24dB		30,000K	4.9
1041	Analog: -20dB		Analog: Moderate			None	50.5
1042	Hybrid: -20dB		Analog: Moderate			None	50.4
1043	Analog: -25dB		Analog: Moderate			None	47.0
1044	Hybrid: -25dB		Analog: Moderate			None	47.0
1045	Analog: -30dB		Analog: Moderate			None	44.5
1046	Hybrid: -30dB		Analog: Moderate			None	44.6
1047	Analog: -35dB		Analog: Moderate			None	46.2
1048	Hybrid: -35dB		Analog: Moderate			None	46.6
1049	Analog: -40dB		Analog: Moderate			None	47.4
1050	Hybrid: -40dB		Analog: Moderate			None	47.5
1051	Analog: -20dB		Analog: Moderate			30,000K	41.4
1052	Hybrid: -20dB		Analog: Moderate			30,000K	42.2
1053	Analog: -25dB		Analog: Moderate			30,000K	41.7
1054	Hybrid: -25dB		Analog: Moderate			30,000K	41.6
1055	Analog: -30dB		Analog: Moderate			30,000K	41.6
1056	Hybrid: -30dB		Analog: Moderate			30,000K	41.8
1057	Analog: -35dB		Analog: Moderate			30,000K	45.0
1058	Hybrid: -35dB		Analog: Moderate			30,000K	45.4
1059	Analog: -40dB		Analog: Moderate			30,000K	47.0
1060	Hybrid: -40dB		Analog: Moderate			30,000K	47.1
1061			Analog: Moderate		Analog: -20dB	None	50.3
1062			Analog: Moderate		Hybrid: -20dB	None	50.2
1063			Analog: Moderate		Analog: -25dB	None	46.8
1064			Analog: Moderate		Hybrid: -25dB	None	46.8
1065			Analog: Moderate		Analog: -30dB	None	44.4
1066			Analog: Moderate		Hybrid: -30dB	None	44.4
1067			Analog: Moderate		Analog: -35dB	None	45.7
1068			Analog: Moderate		Hybrid: -35dB	None	46.2
1069			Analog: Moderate		Analog: -40dB	None	47.2
1070			Analog: Moderate		Hybrid: -40dB	None	47.2
1071			Analog: Moderate		Analog: -20dB	30,000K	42.2
1072			Analog: Moderate		Hybrid: -20dB	30,000K	41.5
1073			Analog: Moderate		Analog: -25dB	30,000K	41.6
1074			Analog: Moderate		Hybrid: -25dB	30,000K	41.6
1075			Analog: Moderate		Analog: -30dB	30,000K	41.5
1076			Analog: Moderate		Hybrid: -30dB	30,000K	41.6
1077			Analog: Moderate		Analog: -35dB	30,000K	44.6
1078			Analog: Moderate		Hybrid: -35dB	30,000K	44.9
1079			Analog: Moderate		Analog: -40dB	30,000K	46.7
1080			Analog: Moderate		Hybrid: -40dB	30,000K	46.8

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**Table 3 - Objective Test Results Single Interferer into the Main FM channel
the Technics SA-EX110P-K hi-Fi receiver (NRSC F.1 and F.2)**

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1001		Analog: +16dB	Analog: Moderate			None	41.5
1002		Hybrid: +16dB	Analog: Moderate			None	40.1
1003		Analog: +6dB	Analog: Moderate			None	31.2
1004		Hybrid: +6dB	Analog: Moderate			None	30.1
1005		Analog: -4dB	Analog: Moderate			None	17.9
1006		Hybrid: -4dB	Analog: Moderate			None	17.5
1007		Analog: -14dB	Analog: Weak			None	2.0
1008		Hybrid: -14dB	Analog: Weak			None	1.9
1009		Analog: -24dB	Analog: Weak			None	1.8
1010		Hybrid: -24dB	Analog: Weak			None	1.2
1011		Analog: +16dB	Analog: Moderate			30,000K	39.6
1012		Hybrid: +16dB	Analog: Moderate			30,000K	38.6
1013		Analog: +6dB	Analog: Moderate			30,000K	31.3
1014		Hybrid: +6dB	Analog: Moderate			30,000K	29.8
1015		Analog: -4dB	Analog: Moderate			30,000K	17.9
1016		Hybrid: -4dB	Analog: Moderate			30,000K	17.5
1017		Analog: -14dB	Analog: Weak			30,000K	1.9
1018		Hybrid: -14dB	Analog: Weak			30,000K	1.9
1019		Analog: -24dB	Analog: Weak			30,000K	1.8
1020		Hybrid: -24dB	Analog: Weak			30,000K	1.3
1021		Analog: Moderate	Analog: +16dB			None	40.4
1022		Analog: Moderate	Hybrid: +16dB			None	38.7
1023		Analog: Moderate	Analog: +6dB			None	30.0
1024		Analog: Moderate	Hybrid: +6dB			None	28.7
1025		Analog: Moderate	Analog: -4dB			None	18.7
1026		Analog: Moderate	Hybrid: -4dB			None	12.0
1027		Analog: Weak	Analog: -14dB			None	2.0
1028		Analog: Weak	Hybrid: -14dB			None	1.7
1029		Analog: Weak	Analog: -24dB			None	1.4
1030		Analog: Weak	Hybrid: -24dB			None	-0.2
1031		Analog: Moderate	Analog: +16dB			30,000K	39.1
1032		Analog: Moderate	Hybrid: +16dB			30,000K	37.5
1033		Analog: Moderate	Analog: +6dB			30,000K	30.1
1034		Analog: Moderate	Hybrid: +6dB			30,000K	28.6
1035		Analog: Moderate	Analog: -4dB			30,000K	18.2
1036		Analog: Moderate	Hybrid: -4dB			30,000K	12.0
1037		Analog: Weak	Analog: -14dB			30,000K	1.9
1038		Analog: Weak	Hybrid: -14dB			30,000K	1.6
1039		Analog: Weak	Analog: -24dB			30,000K	1.4

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#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1040			Analog: Weak	Hybrid: -24dB		30,000K	-0.1
1041	Analog: -20dB		Analog: Moderate			None	52.0
1042	Hybrid: -20dB		Analog: Moderate			None	51.9
1043	Analog: -25dB		Analog: Moderate			None	48.9
1044	Hybrid: -25dB		Analog: Moderate			None	48.5
1045	Analog: -30dB		Analog: Moderate			None	44.8
1046	Hybrid: -30dB		Analog: Moderate			None	41.9
1047	Analog: -35dB		Analog: Moderate			None	39.7
1048	Hybrid: -35dB		Analog: Moderate			None	28.7
1049	Analog: -40dB		Analog: Moderate			None	34.6
1050	Hybrid: -40dB		Analog: Moderate			None	6.1
1051	Analog: -20dB		Analog: Moderate			30,000K	42.5
1052	Hybrid: -20dB		Analog: Moderate			30,000K	42.4
1053	Analog: -25dB		Analog: Moderate			30,000K	42.1
1054	Hybrid: -25dB		Analog: Moderate			30,000K	41.9
1055	Analog: -30dB		Analog: Moderate			30,000K	41.0
1056	Hybrid: -30dB		Analog: Moderate			30,000K	39.6
1057	Analog: -35dB		Analog: Moderate			30,000K	38.3
1058	Hybrid: -35dB		Analog: Moderate			30,000K	28.8
1059	Analog: -40dB		Analog: Moderate			30,000K	34.1
1060	Hybrid: -40dB		Analog: Moderate			30,000K	6.0
1061			Analog: Moderate		Analog: -20dB	None	52.5
1062			Analog: Moderate		Hybrid: -20dB	None	51.4
1063			Analog: Moderate		Analog: -25dB	None	49.8
1064			Analog: Moderate		Hybrid: -25dB	None	46.8
1065			Analog: Moderate		Analog: -30dB	None	45.8
1066			Analog: Moderate		Hybrid: -30dB	None	35.1
1067			Analog: Moderate		Analog: -35dB	None	40.6
1068			Analog: Moderate		Hybrid: -35dB	None	14.0
1069			Analog: Moderate		Analog: -40dB	None	35.1
1070			Analog: Moderate		Hybrid: -40dB	None	2.7
1071			Analog: Moderate		Analog: -20dB	30,000K	42.4
1072			Analog: Moderate		Hybrid: -20dB	30,000K	42.3
1073			Analog: Moderate		Analog: -25dB	30,000K	42.2
1074			Analog: Moderate		Hybrid: -25dB	30,000K	41.5
1075			Analog: Moderate		Analog: -30dB	30,000K	41.2
1076			Analog: Moderate		Hybrid: -30dB	30,000K	34.7
1077			Analog: Moderate		Analog: -35dB	30,000K	38.7
1078			Analog: Moderate		Hybrid: -35dB	30,000K	14.4
1079			Analog: Moderate		Analog: -40dB	30,000K	34.5
1080			Analog: Moderate		Hybrid: -40dB	30,000K	2.6

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**Table 4 - Objective Test Results Single Interferer into the Main FM channel
the Sony CFD-S22 portable receiver (NRSC F.1 and F.2)**

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1001		Analog: +16dB	Analog: Moderate			None	31.3
1002		Hybrid: +16dB	Analog: Moderate			None	30.8
1003		Analog: +6dB	Analog: Moderate			None	21.2
1004		Hybrid: +6dB	Analog: Moderate			None	20.8
1005		Analog: -4dB	Analog: Moderate			None	4.4
1006		Hybrid: -4dB	Analog: Moderate			None	3.7
1007		Analog: -14dB	Analog: Weak			None	1.1
1008		Hybrid: -14dB	Analog: Weak			None	0.7
1009		Analog: -24dB	Analog: Weak			None	-0.1
1010		Hybrid: -24dB	Analog: Weak			None	-0.4
1011		Analog: +16dB	Analog: Moderate			30,000K	30.7
1012		Hybrid: +16dB	Analog: Moderate			30,000K	30.3
1013		Analog: +6dB	Analog: Moderate			30,000K	21.2
1014		Hybrid: +6dB	Analog: Moderate			30,000K	20.8
1015		Analog: -4dB	Analog: Moderate			30,000K	4.4
1016		Hybrid: -4dB	Analog: Moderate			30,000K	3.7
1017		Analog: -14dB	Analog: Weak			30,000K	1.0
1018		Hybrid: -14dB	Analog: Weak			30,000K	0.7
1019		Analog: -24dB	Analog: Weak			30,000K	-0.2
1020		Hybrid: -24dB	Analog: Weak			30,000K	-0.4
1021		Analog: Moderate	Analog: +16dB			None	32.4
1022		Analog: Moderate	Hybrid: +16dB			None	31.8
1023		Analog: Moderate	Analog: +6dB			None	22.3
1024		Analog: Moderate	Hybrid: +6dB			None	21.8
1025		Analog: Moderate	Analog: -4dB			None	7.0
1026		Analog: Moderate	Hybrid: -4dB			None	5.8
1027		Analog: Weak	Analog: -14dB			None	1.4
1028		Analog: Weak	Hybrid: -14dB			None	1.0
1029		Analog: Weak	Analog: -24dB			None	0.4
1030		Analog: Weak	Hybrid: -24dB			None	-0.5
1031		Analog: Moderate	Analog: +16dB			30,000K	31.7
1032		Analog: Moderate	Hybrid: +16dB			30,000K	31.3
1033		Analog: Moderate	Analog: +6dB			30,000K	22.2
1034		Analog: Moderate	Hybrid: +6dB			30,000K	21.7
1035		Analog: Moderate	Analog: -4dB			30,000K	7.0
1036		Analog: Moderate	Hybrid: -4dB			30,000K	5.7
1037		Analog: Weak	Analog: -14dB			30,000K	1.4
1038		Analog: Weak	Hybrid: -14dB			30,000K	1.0
1039		Analog: Weak	Analog: -24dB			30,000K	0.4

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#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)
1040			Analog: Weak	Hybrid: -24dB		30,000K	-0.4
1041	Analog: -20dB		Analog: Moderate			None	24.1
1042	Hybrid: -20dB		Analog: Moderate			None	18.7
1043	Analog: -25dB		Analog: Moderate			None	11.8
1044	Hybrid: -25dB		Analog: Moderate			None	3.3
1045	Analog: -30dB		Analog: Moderate			None	5.2
1046	Hybrid: -30dB		Analog: Moderate			None	1.6
1047	Analog: -35dB		Analog: Moderate			None	0.4
1048	Hybrid: -35dB		Analog: Moderate			None	0.7
1049	Analog: -40dB		Analog: Moderate			None	0.8
1050	Hybrid: -40dB		Analog: Moderate			None	0.4
1051	Analog: -20dB		Analog: Moderate			30,000K	24.1
1052	Hybrid: -20dB		Analog: Moderate			30,000K	18.7
1053	Analog: -25dB		Analog: Moderate			30,000K	11.7
1054	Hybrid: -25dB		Analog: Moderate			30,000K	3.3
1055	Analog: -30dB		Analog: Moderate			30,000K	5.2
1056	Hybrid: -30dB		Analog: Moderate			30,000K	1.8
1057	Analog: -35dB		Analog: Moderate			30,000K	0.5
1058	Hybrid: -35dB		Analog: Moderate			30,000K	0.8
1059	Analog: -40dB		Analog: Moderate			30,000K	0.8
1060	Hybrid: -40dB		Analog: Moderate			30,000K	0.5
1061			Analog: Moderate		Analog: -20dB	None	22.3
1062			Analog: Moderate		Hybrid: -20dB	None	20.2
1063			Analog: Moderate		Analog: -25dB	None	8.1
1064			Analog: Moderate		Hybrid: -25dB	None	4.6
1065			Analog: Moderate		Analog: -30dB	None	2.6
1066			Analog: Moderate		Hybrid: -30dB	None	2.5
1067			Analog: Moderate		Analog: -35dB	None	2.0
1068			Analog: Moderate		Hybrid: -35dB	None	2.1
1069			Analog: Moderate		Analog: -40dB	None	3.6
1070			Analog: Moderate		Hybrid: -40dB	None	2.6
1071			Analog: Moderate		Analog: -20dB	30,000K	22.2
1072			Analog: Moderate		Hybrid: -20dB	30,000K	20.1
1073			Analog: Moderate		Analog: -25dB	30,000K	8.1
1074			Analog: Moderate		Hybrid: -25dB	30,000K	4.6
1075			Analog: Moderate		Analog: -30dB	30,000K	2.6
1076			Analog: Moderate		Hybrid: -30dB	30,000K	2.5
1077			Analog: Moderate		Analog: -35dB	30,000K	2.0
1078			Analog: Moderate		Hybrid: -35dB	30,000K	2.1
1079			Analog: Moderate		Analog: -40dB	30,000K	3.6
1080			Analog: Moderate		Hybrid: -40dB	30,000K	2.5

4.1.2. IBOC Interference into the Host Analog Main FM Channel (NRSC J.1)

Measurements of Signal-to-Noise ratio (SNR) and stereo separation were made for IBOC interference into the host analog main FM channel. Table 5 summarizes the results of the objective compatibility tests for IBOC interference into the Host analog main channel (NRSC J.1) of the Delphi 09394139 automotive receiver. Table 6 summarizes the results of the objective compatibility tests for IBOC interference into the Host analog main channel of the Pioneer KEH-1900 automotive receiver. Table 7 summarizes the results of the objective compatibility tests for IBOC interference into the Host analog main channel of the Technics SA-EX110P-K hi-fi receiver. Table 8 summarizes the results of the objective compatibility tests for IBOC interference into the Host analog main channel of the Sony CFD-S22 portable receiver.

Table 5 – Objective Test Results – IBOC Interferers into Host Main Analog Compatibility of the Delphi 09394139 automotive receiver (NRSC J.1)

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)	L/R Separation (dB)
1101			Analog: Strong			None	59.4	-35.5
1102			Hybrid: Strong			None	59.3	-35.5
1103			Analog: Strong			30,000K	56.0	-35.6
1104			Hybrid: Strong			30,000K	56.0	-35.6

Table 6 – Objective Test Results – IBOC Interferers into Host Main Analog Compatibility of the Pioneer KEH-1900 automotive receiver (NRSC J.1)

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)	L/R Separation (dB)
1101			Analog: Strong			None	56.4	-44.0
1102			Hybrid: Strong			None	56.3	-43.8
1103			Analog: Strong			30,000K	54.0	-43.5
1104			Hybrid: Strong			30,000K	54.0	-43.4

Table 7 – Objective Test Results – IBOC Interferers into Host Main Analog Compatibility of the Technics SA-EX110P-K hi-fi receiver (NRSC J.1)

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)	L/R Separation (dB)
1101			Analog: Strong			None	58.6	-32.2
1102			Hybrid: Strong			None	49.2	-32.2
1103			Analog: Strong			30,000K	55.2	-32.2
1104			Hybrid: Strong			30,000K	48.7	-32.3

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Table 8 – Objective Test Results – IBOC Interferers into Host Main Analog Compatibility of the Sony CFD-S22 portable receiver(NRSC J.1)

#	Lower 2nd adj	Lower 1st adj	Desired	Upper 1st adj	Upper 2nd adj	AWGN	WQP SNR (dB)	L/R Separation (dB)
1101			Analog: Strong			None	50.9	-35.5
1102			Hybrid: Strong			None	35.4	-34.8
1103			Analog: Strong			30,000K	49.3	-35.5
1104			Hybrid: Strong			30,000K	35.2	-34.8

4.2. Subjective Results Summary

The output of the receiver-under-test was digitally recorded for various interference scenarios over a range of D/U signal ratios. The scenarios are described in a series of tables in the following sections. Each row of the table represents one test designated by an ATTC test number. In the 'Desired' column, the strength of the desired analog signal is indicated: Strong (-47 dBm), Moderate (-62 dBm), or Weak (-77 dBm). In the interferer columns, the mode of the interferer is indicated: Analog or Hybrid. Each interferer also has a fixed D/U number (e.g. +6) next to it indicating that the strength of this interferer is fixed at that particular D/U ratio. The AWGN column indicates the presence or absence of a broadband noise floor. The Audio Cut column indicates the audio material that was played on the desired channel, and ultimately recorded from the output of the analog receiver-under-test.

The digital recordings were edited by ATTC to remove extraneous material such as silence between the test samples. The test samples were also edited to obtain constant perceptual loudness. The edited recordings were made available to Dynastat, Inc. for subsequent subjective evaluation.

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4.2.1. Single Interferers in the Main FM Analog Channel (NRSC F.3 and F.4)

Table 9 tabulates the subjective compatibility test scenarios that were used for single interferers in the main FM analog channel (NRSC F.3 and F.4). The Delphi 09394139 automotive, the Pioneer KEH-1900 automotive, the Technics SA-EX110P-K hi-fi, and the Sony CFD-S22 portable receivers were used in these tests.

Table 9 - Subjective Test Scenarios Single Interferer into the Main FM channel (NRSC F.3 and F.4)

#	Lower 2^{nd} adj.	Lower 1^{st} adj.	Desired	Upper 1^{st} adj.	Upper 2^{nd} adj.	AWGN	Audio Cut
1201		Analog: +16dB	Analog: Moderate			None	Carmen
1202		Hybrid: +16dB	Analog: Moderate			None	Carmen
1203		Analog: +16dB	Analog: Moderate			None	Grant
1204		Hybrid: +16dB	Analog: Moderate			None	Grant
1205		Analog: +16dB	Analog: Moderate			None	Woman
1206		Hybrid: +16dB	Analog: Moderate			None	Woman
1207		Analog: +16dB	Analog: Moderate			30,000K	Debussy
1208		Hybrid: +16dB	Analog: Moderate			30,000K	Debussy
1209		Analog: +16dB	Analog: Moderate			30,000K	REO
1210		Hybrid: +16dB	Analog: Moderate			30,000K	REO
1211		Analog: +16dB	Analog: Moderate			30,000K	Man
1212		Hybrid: +16dB	Analog: Moderate			30,000K	Man
1213		Analog: +6dB	Analog: Moderate			None	Carmen
1214		Hybrid: +6dB	Analog: Moderate			None	Carmen
1215		Analog: +6dB	Analog: Moderate			None	Grant
1216		Hybrid: +6dB	Analog: Moderate			None	Grant
1217		Analog: +6dB	Analog: Moderate			None	Woman
1218		Hybrid: +6dB	Analog: Moderate			None	Woman
1219		Analog: +6dB	Analog: Moderate			30,000K	Debussy
1220		Hybrid: +6dB	Analog: Moderate			30,000K	Debussy
1221		Analog: +6dB	Analog: Moderate			30,000K	REO
1222		Hybrid: +6dB	Analog: Moderate			30,000K	REO
1223		Analog: +6dB	Analog: Moderate			30,000K	Man
1224		Hybrid: +6dB	Analog: Moderate			30,000K	Man
1225		Analog: -4dB	Analog: Moderate			None	Carmen
1226		Hybrid: -4dB	Analog: Moderate			None	Carmen
1227		Analog: -4dB	Analog: Moderate			None	Grant
1228		Hybrid: -4dB	Analog: Moderate			None	Grant
1229		Analog: -4dB	Analog: Moderate			None	Woman
1230		Hybrid: -4dB	Analog: Moderate			None	Woman
1231		Analog: -4dB	Analog: Moderate			30,000K	Debussy
1232		Hybrid: -4dB	Analog: Moderate			30,000K	Debussy
1233		Analog: -4dB	Analog: Moderate			30,000K	REO
1234		Hybrid: -4dB	Analog: Moderate			30,000K	REO
1235		Analog: -4dB	Analog: Moderate			30,000K	Man
1236		Hybrid: -4dB	Analog: Moderate			30,000K	Man
1237		Analog: Moderate	Analog: +16dB			None	Bach
1238		Analog: Moderate	Hybrid: +16dB			None	Bach
1239		Analog: Moderate	Analog: +16dB			None	Santana
1240		Analog: Moderate	Hybrid: +16dB			None	Santana
1241		Analog: Moderate	Analog: +16dB			None	Brokaw
1242		Analog: Moderate	Hybrid: +16dB			None	Brokaw
1243		Analog: Moderate	Analog: +16dB			30,000K	Ibert
1244		Analog: Moderate	Hybrid: +16dB			30,000K	Ibert
1245		Analog: Moderate	Analog: +16dB			30,000K	Vega
1246		Analog: Moderate	Hybrid: +16dB			30,000K	Vega

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#	Lower 2 nd adj.	Lower 1 st adj.	Desired	Upper 1 st adj.	Upper 2 nd adj.	AWGN	Audio Cut
1247			Analog: Moderate	Analog: +16dB		30,000K	Brokaw
1248			Analog: Moderate	Hybrid: +16dB		30,000K	Brokaw
1249			Analog: Moderate	Analog: +6dB		None	Bach
1250			Analog: Moderate	Hybrid: +6dB		None	Bach
1251			Analog: Moderate	Analog: +6dB		None	Santana
1252			Analog: Moderate	Hybrid: +6dB		None	Santana
1253			Analog: Moderate	Analog: +6dB		None	Brokaw
1254			Analog: Moderate	Hybrid: +6dB		None	Brokaw
1255			Analog: Moderate	Analog: +6dB		30,000K	Ibert
1256			Analog: Moderate	Hybrid: +6dB		30,000K	Ibert
1257			Analog: Moderate	Analog: +6dB		30,000K	Vega
1258			Analog: Moderate	Hybrid: +6dB		30,000K	Vega
1259			Analog: Moderate	Analog: +6dB		30,000K	Brokaw
1260			Analog: Moderate	Hybrid: +6dB		30,000K	Brokaw
1261			Analog: Moderate	Analog: -4dB		None	Bach
1262			Analog: Moderate	Hybrid: -4dB		None	Bach
1263			Analog: Moderate	Analog: -4dB		None	Santana
1264			Analog: Moderate	Hybrid: -4dB		None	Santana
1265			Analog: Moderate	Analog: -4dB		None	Brokaw
1266			Analog: Moderate	Hybrid: -4dB		None	Brokaw
1267			Analog: Moderate	Analog: -4dB		30,000K	Ibert
1268			Analog: Moderate	Hybrid: -4dB		30,000K	Ibert
1269			Analog: Moderate	Analog: -4dB		30,000K	Vega
1270			Analog: Moderate	Hybrid: -4dB		30,000K	Vega
1271			Analog: Moderate	Analog: -4dB		30,000K	Brokaw
1272			Analog: Moderate	Hybrid: -4dB		30,000K	Brokaw
1273	Analog: -20dB		Analog: Moderate			None	Messiah
1274	Hybrid: -20dB		Analog: Moderate			None	Messiah
1275	Analog: -20dB		Analog: Moderate			None	MMW
1276	Hybrid: -20dB		Analog: Moderate			None	MMW
1277	Analog: -20dB		Analog: Moderate			None	Woman
1278	Hybrid: -20dB		Analog: Moderate			None	Woman
1279	Analog: -20dB		Analog: Moderate			30,000K	1812
1280	Hybrid: -20dB		Analog: Moderate			30,000K	1812
1281	Analog: -20dB		Analog: Moderate			30,000K	Cray
1282	Hybrid: -20dB		Analog: Moderate			30,000K	Cray
1283	Analog: -20dB		Analog: Moderate			30,000K	Brokaw
1284	Hybrid: -20dB		Analog: Moderate			30,000K	Brokaw
1285	Analog: -40dB		Analog: Moderate			None	Messiah
1286	Hybrid: -40dB		Analog: Moderate			None	Messiah
1287	Analog: -40dB		Analog: Moderate			None	MMW
1288	Hybrid: -40dB		Analog: Moderate			None	MMW
1289	Analog: -40dB		Analog: Moderate			None	Woman
1290	Hybrid: -40dB		Analog: Moderate			None	Woman
1291	Analog: -40dB		Analog: Moderate			30,000K	1812
1292	Hybrid: -40dB		Analog: Moderate			30,000K	1812
1293	Analog: -40dB		Analog: Moderate			30,000K	Cray
1294	Hybrid: -40dB		Analog: Moderate			30,000K	Cray
1295	Analog: -40dB		Analog: Moderate			30,000K	Brokaw
1296	Hybrid: -40dB		Analog: Moderate			30,000K	Brokaw
1297			Analog: Moderate	Analog: -20dB		None	Persian
1298			Analog: Moderate	Hybrid: -20dB		None	Persian
1299			Analog: Moderate	Analog: -20dB		None	Crowded
1300			Analog: Moderate	Hybrid: -20dB		None	Crowded
1301			Analog: Moderate	Analog: -20dB		None	Man
1302			Analog: Moderate	Hybrid: -20dB		None	Man
1303			Analog: Moderate	Analog: -20dB		30,000K	Carmen
1304			Analog: Moderate	Hybrid: -20dB		30,000K	Carmen
1305			Analog: Moderate	Analog: -20dB		30,000K	CSNY
1306			Analog: Moderate	Hybrid: -20dB		30,000K	CSNY

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#	Lower 2 nd adj.	Lower 1 st adj.	Desired	Upper 1 st adj.	Upper 2 nd adj.	AWGN	Audio Cut
1307			Analog: Moderate		Analog: -20dB	30,000K	Man
1308			Analog: Moderate		Hybrid: -20dB	30,000K	Man
1309			Analog: Moderate		Analog: -40dB	None	Persian
1310			Analog: Moderate		Hybrid: -40dB	None	Persian
1311			Analog: Moderate		Analog: -40dB	None	Crowded
1312			Analog: Moderate		Hybrid: -40dB	None	Crowded
1313			Analog: Moderate		Analog: -40dB	None	Man
1314			Analog: Moderate		Hybrid: -40dB	None	Man
1315			Analog: Moderate		Analog: -40dB	30,000K	Carmen
1316			Analog: Moderate		Hybrid: -40dB	30,000K	Carmen
1317			Analog: Moderate		Analog: -40dB	30,000K	CSNY
1318			Analog: Moderate		Hybrid: -40dB	30,000K	CSNY
1319			Analog: Moderate		Analog: -40dB	30,000K	Man
1320			Analog: Moderate		Hybrid: -40dB	30,000K	Man
1321	Analog: -30dB		Analog: Moderate			None	Messiah
1322	Hybrid: -30dB		Analog: Moderate			None	Messiah
1323	Analog: -30dB		Analog: Moderate			None	MMW
1324	Hybrid: -30dB		Analog: Moderate			None	MMW
1325	Analog: -30dB		Analog: Moderate			None	Woman
1326	Hybrid: -30dB		Analog: Moderate			None	Woman
1327	Analog: -30dB		Analog: Moderate			30,000K	1812
1328	Hybrid: -30dB		Analog: Moderate			30,000K	1812
1329	Analog: -30dB		Analog: Moderate			30,000K	Cray
1330	Hybrid: -30dB		Analog: Moderate			30,000K	Cray
1331	Analog: -30dB		Analog: Moderate			30,000K	Brokaw
1332	Hybrid: -30dB		Analog: Moderate			30,000K	Brokaw
1333			Analog: Moderate		Analog: -30dB	None	Persian
1334			Analog: Moderate		Hybrid: -30dB	None	Persian
1335			Analog: Moderate		Analog: -30dB	None	Crowded
1336			Analog: Moderate		Hybrid: -30dB	None	Crowded
1337			Analog: Moderate		Analog: -30dB	None	Man
1338			Analog: Moderate		Hybrid: -30dB	None	Man
1339			Analog: Moderate		Analog: -30dB	30,000K	Carmen
1340			Analog: Moderate		Hybrid: -30dB	30,000K	Carmen
1341			Analog: Moderate		Analog: -30dB	30,000K	CSNY
1342			Analog: Moderate		Hybrid: -30dB	30,000K	CSNY
1343			Analog: Moderate		Analog: -30dB	30,000K	Man
1344			Analog: Moderate		Hybrid: -30dB	30,000K	Man

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4.2.2. Single Interferers into the Main FM Analog Channel in the presence of Multipath (NRSC G.1)

Table 10 tabulates the subjective compatibility test scenarios that were used for single interferers into the main FM analog channel in the presence of multipath (NRSC G.1). The Delphi 09394139 automotive and the Pioneer KEH-1900 automotive receivers were used in these tests.

Table 10 - Subjective Test Scenarios Single Interferer into the Main Analog Channel with Multipath (NRSC G.1)

#	Lower 2 nd adjacent	Lower 1 st adjacent	Desired	Upper 1 st adjacent	Upper 2 nd adjacent	Multipath	AWGN	Audio Cut
1501		Analog: +6dB	Analog: Moderate			US	None	Carmen
1502		Hybrid: +6dB	Analog: Moderate			US	None	Carmen
1503		Analog: +6dB	Analog: Moderate			US	None	Simon
1504		Hybrid: +6dB	Analog: Moderate			US	None	Simon
1505		Analog: +6dB	Analog: Moderate			US	None	Brokaw
1506		Hybrid: +6dB	Analog: Moderate			US	None	Brokaw
1507		Analog: +6dB	Analog: Moderate			US	30,000K	Carmen
1508		Hybrid: +6dB	Analog: Moderate			US	30,000K	Carmen
1509		Analog: +6dB	Analog: Moderate			US	30,000K	Simon
1510		Hybrid: +6dB	Analog: Moderate			US	30,000K	Simon
1511		Analog: +6dB	Analog: Moderate			US	30,000K	Brokaw
1512		Hybrid: +6dB	Analog: Moderate			US	30,000K	Brokaw
1513		Analog: +6dB	Analog: Moderate			UF	None	Messiah
1514		Hybrid: +6dB	Analog: Moderate			UF	None	Messiah
1515		Analog: +6dB	Analog: Moderate			UF	None	Clapton
1516		Hybrid: +6dB	Analog: Moderate			UF	None	Clapton
1517		Analog: +6dB	Analog: Moderate			UF	None	Man
1518		Hybrid: +6dB	Analog: Moderate			UF	None	Man
1519		Analog: +6dB	Analog: Moderate			UF	30,000K	Messiah
1520		Hybrid: +6dB	Analog: Moderate			UF	30,000K	Messiah
1521		Analog: +6dB	Analog: Moderate			UF	30,000K	Clapton
1522		Hybrid: +6dB	Analog: Moderate			UF	30,000K	Clapton
1523		Analog: +6dB	Analog: Moderate			UF	30,000K	Man
1524		Hybrid: +6dB	Analog: Moderate			UF	30,000K	Man
1525			Analog: Moderate	Analog: +6dB		US	None	Stravinsky
1526			Analog: Moderate	Hybrid: +6dB		US	None	Stravinsky
1527			Analog: Moderate	Analog: +6dB		US	None	Fleetwood
1528			Analog: Moderate	Hybrid: +6dB		US	None	Fleetwood
1529			Analog: Moderate	Analog: +6dB		US	None	Woman
1530			Analog: Moderate	Hybrid: +6dB		US	None	Woman
1531			Analog: Moderate	Analog: +6dB		US	30,000K	Stravinsky
1532			Analog: Moderate	Hybrid: +6dB		US	30,000K	Stravinsky
1533			Analog: Moderate	Analog: +6dB		US	30,000K	Fleetwood
1534			Analog: Moderate	Hybrid: +6dB		US	30,000K	Fleetwood
1535			Analog: Moderate	Analog: +6dB		US	30,000K	Woman
1536			Analog: Moderate	Hybrid: +6dB		US	30,000K	Woman
1537			Analog: Moderate	Analog: +6dB		UF	None	Debussy
1538			Analog: Moderate	Hybrid: +6dB		UF	None	Debussy
1539			Analog: Moderate	Analog: +6dB		UF	None	REO
1540			Analog: Moderate	Hybrid: +6dB		UF	None	REO
1541			Analog: Moderate	Analog: +6dB		UF	None	Brokaw
1542			Analog: Moderate	Hybrid: +6dB		UF	None	Brokaw
1543			Analog: Moderate	Analog: +6dB		UF	30,000K	Debussy
1544			Analog: Moderate	Hybrid: +6dB		UF	30,000K	Debussy
1545			Analog: Moderate	Analog: +6dB		UF	30,000K	REO
1546			Analog: Moderate	Hybrid: +6dB		UF	30,000K	REO

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#	Lower 2 nd adjacent	Lower 1 st adjacent	Desired	Upper 1 st adjacent	Upper 2 nd adjacent	Multipeath	AWGN	Audio Cut
1547			Analog: Moderate	Analog: +6dB		UF	30,000K	Brokaw
1548			Analog: Moderate	Hybrid: +6dB		UF	30,000K	Brokaw
1549		Analog:+16dB	Analog: Moderate			US	None	Carmen
1550		Hybrid:+16dB	Analog: Moderate			US	None	Carmen
1551			Analog: Moderate	Analog:+16dB		US	None	Messiah
1552			Analog: Moderate	Hybrid:+16dB		US	None	Messiah
1553		Analog:+16dB	Analog: Moderate			UF	None	Debussey
1554		Hybrid:+16dB	Analog: Moderate			UF	None	Debussey
1555			Analog: Moderate	Analog:+16dB		UF	None	Stravinsky
1556			Analog: Moderate	Hybrid:+16dB		UF	None	Stravinsky

4.2.3. IBOC Interference into the Host Analog Main FM Channel (NRSC J.2)

Table 11 tabulates the subjective compatibility test scenarios that were used for IBOC interference into the Host analog main channel (NRSC J.2).

Table 11 – Subjective Test Scenarios – IBOC Interferers into Host Main Analog Compatibility (NRSC J.2)

#	Lower 2 nd adj.	Lower 1 st adj.	Desired	Upper 1 st adj.	Upper 2 nd adj.	AWGN	Audio Cut
1351			Analog: Strong			None	1812
1352			Hybrid: Strong			None	1812
1353			Analog: Strong			None	Fleetwood
1354			Hybrid: Strong			None	Fleetwood
1355			Analog: Strong			None	Woman
1356			Hybrid: Strong			None	Woman
1357			Analog: Strong			30,000K	1812
1358			Hybrid: Strong			30,000K	1812
1359			Analog: Strong			30,000K	Fleetwood
1360			Hybrid: Strong			30,000K	Fleetwood
1361			Analog: Strong			30,000K	Woman
1362			Hybrid: Strong			30,000K	Woman